

Application No.: 10/674999

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Amendments to the Claims:

The following Listing of Claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Presently Amended) A composition for forming an insulating layer, the composition comprising:
a mixture comprising surface modified inorganic nanoparticles present in an amount of 5 to 95 percent by weight of the mixture dispersed in polymethylsilsesquioxane present in an amount of 5 to 95 percent by weight of the mixture;
a solvent; and
one or more optional additives,
wherein the composition has a viscosity suitable for applying the composition using a digital printing technique.
2. (Original) The composition of claim 1, wherein the composition has a viscosity of 1 to 100,000 centipoise measured using continuous stress sweep, over shear rates of 1 s^{-1} to 1000 s^{-1} .
3. (Original) The composition of claim 1, wherein the composition has a viscosity suitable for ink jet printing.
4. (Original) The composition of claim 3, wherein the composition has a viscosity of 1 to 40 centipoise measured using continuous stress sweep, over shear rates of 1 s^{-1} to 1000 s^{-1} .
5. (Original) The composition of claim 1, wherein the nanoparticles comprise one or more of silica, zirconia, and alumina particles.
6. (Cancelled).

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7. (Presently Amended) The composition of claim 6 1, wherein the surface modifier comprises a carboxylic acid, a carboxylic acid derivative, a silane, or mixtures thereof.
8. (Original) The composition of claim 7, wherein the carboxylic acid derivatives comprise hexanoic acid or 2[-2-(2-methoxyethoxy)ethoxy] acetic acid.
9. (Original) The composition of claim 7, wherein the silanes comprise methyltriethoxysilane, methyltrimethoxysilane, isobutyltriethoxysilane, isobutyltrimethoxysilane, isooctyltriethoxysilane, isooctyltrimethoxysilane, or mixtures thereof.
10. (Original) The composition of claim 1, wherein the nanoparticles have an average size of 1 to 500 nanometers.
11. (Original) The composition of claim 1, wherein the nanoparticles have an average size of 5 to 125 nanometers.
12. (Original) The composition of claim 1, wherein the one or more optional additives are present in an amount of 0 to 60 percent by weight of the composition after evaporation of substantially all the solvent.
13. (Original) The composition of claim 1, wherein the one or more optional additives comprise an adhesion promoter.
14. (Original) The composition of claim 13, wherein the adhesion promoter comprises polyethyloxazoline.
15. (Original) The composition of claim 13, wherein the adhesion promoter is present in an amount of 0 to 5 percent by weight of the composition after evaporation of substantially all the solvent.

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16. (Original) The composition of claim 1, wherein the one or more optional additives comprise one or more tetraalkoxysilanes and alkyltrialkoxysilanes.
17. (Original) The composition of claim 16, wherein the alkoxysilanes are selected from the group consisting essentially of tetraethoxysilane, tetramethoxysilane, methytriethoxysilane, and methyltrimethoxysilane.
18. (Original) The composition of claim 16, wherein the one or more tetraalkoxysilanes and alkyltrialkoxysilanes are present in an amount of 0 to 50 percent by weight of the composition after evaporation of substantially all the solvent.
19. (Original) The composition of claim 1, wherein the one or more optional additives comprise a flexibilizer.
20. (Original) The composition of claim 19, wherein the flexibilizer comprises one or more of dialkyldialkoxysilanes and trialkylmonoalkoxysilanes.
21. (Original) The composition of claim 20, wherein the one or more dialkyldialkoxysilanes and trialkylmonoalkoxysilanes are selected from the group consisting essentially of dimethyldiethoxysilane, dimethyldimethoxysilane, trimethylethoxysilane, and trimethylmethoxysilane.
22. (Original) The composition of claim 19, wherein the flexibilizer is present in an amount of 0 to 40 percent by weight of the composition after evaporation of substantially all the solvent.
23. (Original) The composition of claim 1, wherein the one or more optional additives comprise an organic acid.
24. (Original) The composition of claim 23, wherein the organic acid comprises acetic acid, methoxyethoxyacetic acid, hexanoic acid, or mixtures thereof.

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25. (Original) The composition of claim 23, wherein the organic acid is present in an amount of 0 to 3 percent by weight of the composition after evaporation of substantially all the solvent.
26. (Original) The composition of claim 1, wherein the solvent comprises an alcohol, a ketone, an ether, an acetate, or mixtures thereof.
27. (Presently Amended) A method of printing an insulating layer for touch panel applications comprising:
providing a composition for forming an insulating layer, the composition comprising (i) a mixture comprising surface modified inorganic nanoparticles present in an amount of 5 to 95 percent by weight of the mixture dispersed in polymethylsilsesquioxane present in an amount of 5 to 95 percent by weight of the mixture, (ii) a solvent, and (iii) one or more optional additives;
~~and~~
printing the composition onto a substrate using a digital printing technique; and
incorporating the substrate into a touch activated user input device.
28. (Original) The method of claim 27, wherein the digital printing technique comprises ink jet printing.
29. (Original) The method of claim 27, wherein the digital printing technique comprises aerosol printing or syringe printing.
30. (Original) The method of claim 27, further comprising the step of drying the composition after the printing step to substantially remove the solvent.
31. (Cancelled).
32. (Presently Amended) A touch activated user input device comprising:
a substrate comprising a resistive layer in an active area of the user input device; and

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an insulating layer ~~deposited onto~~ disposed at least over a portion of the resistive layer ~~substrate~~, the insulating layer comprising polyorganosilsesquioxane.

33. (Original) The touch activated user input device of claim 32, wherein the insulating layer further comprises inorganic nanoparticles.
34. (Original) The touch activated user input device of claim 32, wherein the substrate comprises glass or plastic.
35. (Presently Amended) The touch activated user input device of claim 32, wherein the ~~plastic~~ substrate comprises polyethylene terephthalate.
36. (Presently Amended) The touch activated user input device of claim 32, wherein the substrate further comprises conductive traces ~~on a non-conductive surface~~.
37. (Presently Amended) The touch activated user input device of claim ~~32~~ 36, wherein the insulating layer ~~is deposited as a protective coat~~ extends over the conductive traces.
38. (Original) The touch activated user input device of claim 32, wherein the insulating layer is deposited as a protective coat over a linearization layer.
39. (Presently Amended) The touch activated user input device of claim 32, wherein ~~the substrate has a primary surface, and wherein~~ the insulating layer ~~is deposited as~~ forms a hard coat ~~over a majority of the primary surface~~.
40. (Original) The touch activated user input device of claim 36, wherein the conductive traces comprise a conductive polymer.

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41. (Presently Amended) The touch activated user input device of claim ~~36~~ 37, ~~wherein the insulating layer at least partially covers the conductive traces and wherein the insulating composition~~ layer over the conductive traces is substantially free of pinholes.
42. (Cancelled).
43. (Original) The touch activated user input device of claim 32, wherein the insulating layer comprises at least 10 percent by weight polymethylsilsesquioxane.
44. (Original) The touch activated user input device of claim 32, wherein the insulating layer comprises from 10 to 95 percent by weight polymethylsilsesquioxane and from 5 to 90 percent by weight inorganic nanoparticles.
45. (Original) The touch activated user input device of claim 32, wherein the insulating layer is substantially stable at a temperature of 500 °C.
46. (Presently Amended) A method for making a touch activated user input device comprising:
- providing a substrate;
 - printing a composition containing polyorganosilsesquioxane and surface modified nanoparticles onto the substrate;
 - curing the composition ~~containing polyorganosilsesquioxane~~ at a temperature below 150 °C to form an insulating layer.
47. (Original) The method of claim 46, wherein the step of printing comprises ink jet printing.
48. (Original) The method of claim 46, wherein the step of printing comprises screen printing.

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49. (Original) The method of claim 46, wherein the insulating layer is substantially stable at a temperature of 500 °C.

50. (Cancelled).

51. (Presently Amended) The method of claim ~~50~~ 46, wherein the inorganic nanoparticles comprise one or more of silica, zirconia, and alumina particles.

52. (Cancelled).

53. (Presently Amended) The method of claim 46, wherein the composition ~~containing polymethylsilsesquioxane~~ comprises at least 10 percent by weight polymethylsilsesquioxane.

54. (Original) The method of claim 46, wherein after the curing step the composition comprises from 10 to 95 percent by weight polymethylsilsesquioxane and from 5 to 90 percent by weight inorganic nanoparticles.

55. (Newly Presented) A composition for forming an insulating layer, the composition comprising:

a mixture comprising inorganic nanoparticles present in an amount of 5 to 95 percent by weight of the mixture dispersed in polymethylsilsesquioxane present in an amount of 5 to 95 percent by weight of the mixture;

a solvent; and

one or more of

- (i) an adhesion promoter that comprises polyethyloxazoline,
- (ii) a tetraalkoxysilane,
- (iii) an alkyltrialkoxysilane,

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(iv) a flexibilizer that comprises one or more of dialkyldialkoxysilanes and trialkylmonoalkoxysilanes, and

(v) an organic acid,

wherein the composition has a viscosity suitable for applying the composition using a digital printing technique.

56. (Newly Presented) The touch activated user input device of claim 32, wherein the resistive layer comprises a conductive polymer.

57. (Newly Presented) The touch activated user input device of claim 32, wherein the resistive layer comprises a transparent conductive oxide.

58. (Newly Presented) The touch activated user input device of claim 32, wherein the resistive layer is continuous.

59. (Newly Presented) The touch activated user input device of claim 32, wherein the resistive layer is discontinuous.